DOCUMENT RESUME

ED 377 364 CE 067 803

AUTHOR McKnight, Claire E.; Rotter, Naomi
TITLE A Regional Approach to Rail Transit Training for the New York Metropolitan Area. Final Report.
INSTITUTION Department of Transportation, Washington, D.C.
REPORT NO DOT-T-92-08
PUB DATE Jun 91
NOTE 63p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Agency Cooperation; Articulation (Education); Community Colleges; Comparative Analysis; *Cooperative Planning; *Driver Education; Educational Needs; *Educational Planning; Educational Practices; Feasibility Studies; Needs Assessment; Postsecondary Education; *Rail Transportation; *Regional Planning; Unions; *Vocational Education
IDENTIFIERS *New York (New York Metropolitan Area)

ABSTRACT

A study examined the feasibility of a regional approach to rail transit training in the New York metropolitan area. First, case studies were collected to document existing training practices at the five agencies currently responsible for training rail transit workers in the New York metropolitan area and to identify mutual training needs that could be addressed on a regional basis. Next, innovative approaches used by other agencies were reviewed and possible means of sharing training were determined. Information obtained from interviews with personnel and reviews of various documents established 15 skills/skill areas in which at least 2 of the 5 agencies needed or wanted to expand training. Several agencies also wanted to expand their training capabilities through the use of new educational technologies but had been prevented from doing so by budget constraints. The following were recommended as feasible ways of adopting a regional approach to rail transit training: periodic meetings of training managers to discuss current problems/solutions; exchange of training course catalogs and cross-registration; joint development of training material; joint application for grants from the Departments of Labor, Transportation, and Education; and collaboration with community colleges as a group to develop rail-related courses. (MN)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

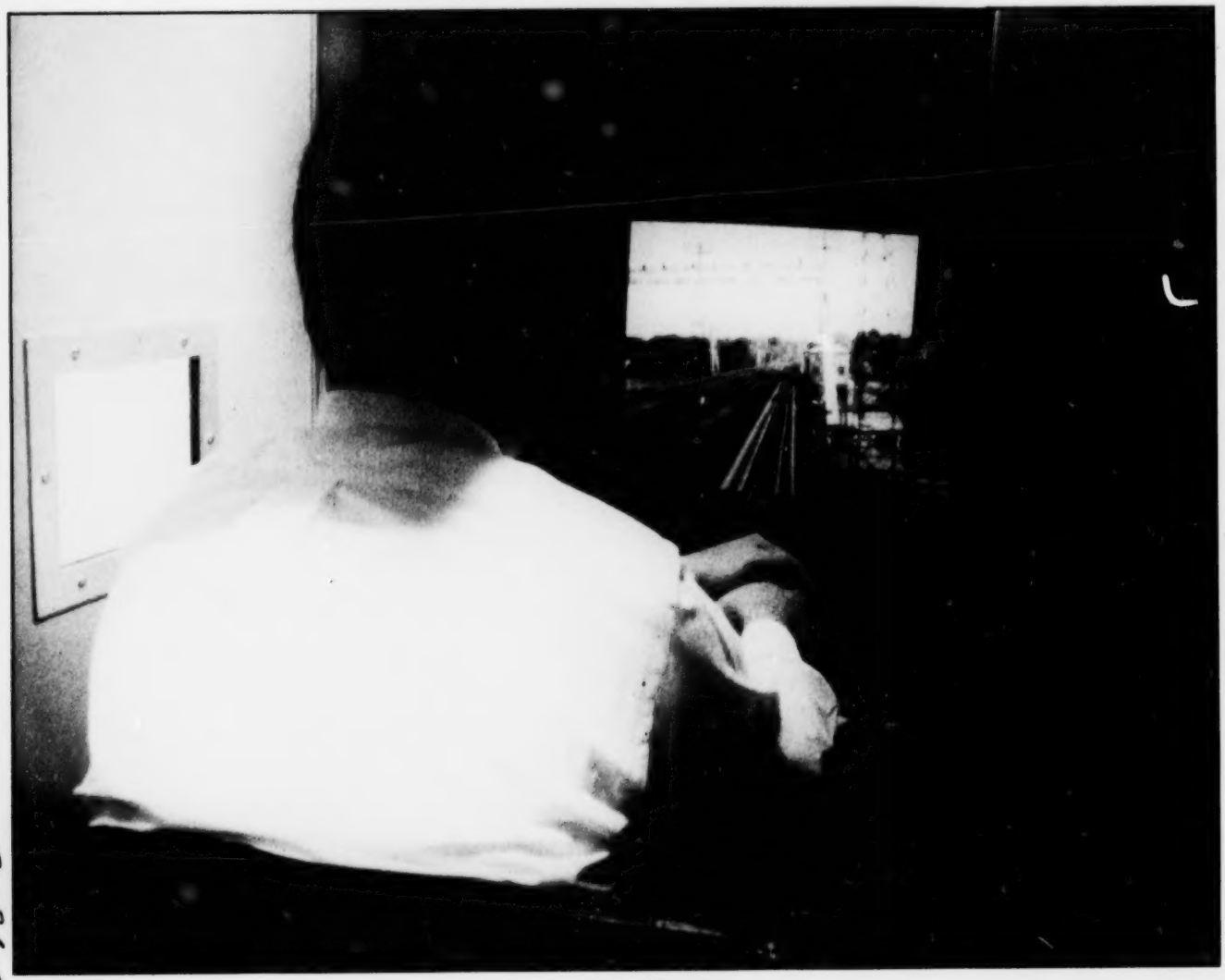
CE

U.S. Department of Transportation

# A Regional Approach to Rail Transit Training for the New York Metropolitan Area

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

**June 1991**



BEST COPY AVAILABLE

# A Regional Approach to Rail Transit Training for the New York Metropolitan Area

**Final Report**
**June 1991**

**Prepared by**

Claire E. McKnight
Institute for Transportation Systems
and the City College of New York

and

Naomi Rotter
Center for Transportation Studies
and Research
New Jersey Institute of Technology

**Distributed in Cooperation with**

Technology Sharing Program
U.S. Department of Transportation
Washington, D.C. 20590

**DOT-T-92-08**

ACKNOWLEDGEMENTS

This project would have not been possible without the many hours that the people in the various agencies spent answering our questions. While we cannot list everyone, we would like to mention the people who helped the most.

At New Jersey Transit, we want to particularly thank Joy McGovern, Steve Klejst, and John Murgolo.

At PATH, we want to thank Maria Bordas. In addition, Fred Myers at the Port Authority of New York and New Jersey was also very generous with his time.

At Metro North Commuter Rail, we want to thank Mark Campbell.

At Long Island Railroad, we want to thank Harry Lynch and Bob Grimesmann.

At New York City Transit Authority we want to thank Liz Lowe and Phil Doran.

## Executive Summary

The purpose of this project was to study the feasibility of a regional approach to rail transit training in the New York metropolitan area and to recommend a means for implementing such a cooperative training effort. The study had two parts. The first part was to study the existing training at the five agencies, to document the training needs of each agency, and to determine mutual training needs that could be addressed on a regional basis. The five agencies are the New Jersey Transit Rail Division, the Port Authority Trans-Hudson Corporation, Metro North Commuter Rail, Long Island Railroad, and the New York City Transit Authority. The second part was to determine possible means of sharing training, drawing on the literature and from innovative approaches by other organizations.

As a first step in the project, the study team met with representatives of the training departments of the five agencies as a group to explain the project to them, to get their reactions, and to get their views on their agency's training needs and which of these would be best met regionally. The study team then met individually with a liaison from each agency to get an overview of training at their agency. A two page checklist of information to be obtained was used to guide the interviews, but other than that they were open-ended. When the case studies of training were complete, the identified training needs for each agency were compared to determine the areas of mutual need. From the list of the mutual needs, those training areas that are the best suited to a regional approach were identified.

After the documentation of training at the five agencies, the study team visited other organizations to find innovative approaches to training, particularly training rail personnel.

The study team then generated several ideas on coordinating or sharing training. The ideas were presented to the training representatives from the five agencies in a group meeting. The object of the meeting was both to provide an opportunity for the training representatives to discuss the ideas, but also to implement one of the ideas, specifically periodic meetings of the heads of the training departments to share problems and ideas, that is, a form of networking.

One aspect of the timing of the project is important to the understanding of changes that have taken place. The first meetings on the project took place in early 1987. At the time the national and regional economies were both strong. Some of the ideas for a coordinated approach to training were quite long sighted; for example, a regional institute for rail training was considered, as were programs to develop interest in rail careers among minority high school and junior high students. Since that first meeting,

both the national and regional economies are in recession and the States of New Jersey and New York as well as most of the cities in the region have severe budget deficits. Similarly, all five of the agencies have budget difficulties. As a result, the types of ideas that are feasible for implementation in the near future have changed to those with low cost or with immediate returns in improved productivity or efficiency.

All of the rail agencies studied were part of larger regional public transportation organizations. Each agency had a training division within the human resource department. The training division generally dated from shortly after the shift from the private to the public sector. All of the training divisions were still expanding and the training managers had lists of courses or programs that they planned to develop. In all of the agencies a substantial amount of training, particularly technical training, was done outside the training division, mostly through on-the-job training, but also through other departments, such as Safety or Rules Departments. Long standing training programs that had been developed in response to FRA regulations were often left in the departments that had originally developed them.

The extent of centralization of training within the training divisions varied. In one agency, the training division dealt primarily with management and supervisory training. In others it provided all levels of training from laborer, through craft and technical, to managerial training. The amount of training provided to the various operating departments differed. Generally, the transportation departments and equipment maintenance departments had the most extensive range of courses, and their employees tended to receive the most training. The track maintenance departments tended to receive the least.

For union-level positions, the agencies tended to promote from within. At managerial levels, the agencies were more likely to hire from outside the agency and, for support departments (e.g., personnel, MIS, contracts), outside the rail industry. The differences in promotion and hiring policies for union and managerial level positions combined with the requirement of college degrees for higher level positions creates a discontinuum at the point of transition from union to managerial levels, which usually is at supervisory positions. Training managers and heads of operating departments frequently mentioned supervisory training as a major need.

The unions were generally described as supportive of training. However, union contracts at all agencies interfered with some training initiatives. At one agency, the unions refused to allow testing except in a few limited cases. At another agency, a union had opposed the implementation of an apprentice program. On the other hand, one union requested more training in order that maintenance of new equipment be done in-house rather than

externally under contract.

None of the agencies had a systematic process of developing courses and course curricula tied to agency objectives, documented skill deficiencies, or identified career paths. Some of the agencies had previously conducted a training needs assessment, but none of them had done one recently. No training manager mentioned organizational goals as a basis for course development. Most frequently the contents of new courses were based on discussions with department heads or developed around the purchases of new equipment. Formal training was a combination of in-house courses by the agency's training department, in-house courses provided by training consultants or equipment vendors, and external programs.

The scheduling of courses was typically based on informal discussions with department heads. Some of the agencies scheduled courses to occur after hiring for specific positions. At other agencies, the courses were offered to several employees at a time while only one or two were actually moving into a relevant position. Therefore, some employees received training in advance of their actual promotion into a position or after they had been in the position for a while.

Selection of employees to be sent to training programs is generally done by department heads and supervisors. The training managers did not know how the selections were made. A common problem was that people who were selected (or self-selected) to take part in a training course sometimes did not attend because they were needed in the department on the day of the course. While in a few cases this was due to emergencies, apparently it was more commonly because no plans had been made to replace the employees while they were in training. One response was to over book the courses.

There were several personnel positions that all the agencies mentioned having trouble filling; for example, electricians and electronics workers. The difficulty varied with the relative wage rates paid by the different commuter rail agencies. Several agencies were developing extensive training programs or apprentice programs to address their needs for more people or greater skills in these areas.

Evaluation of training was done primarily through trainee satisfaction or reaction sheets, that is, questionnaires filled out by the participants at the end of the course. Questions concerned the quality of instruction, the usefulness of the material, and the facilities. The training manager or course developer sometimes talked to supervisors or managers about the course after the first time it was offered. Two agencies had formal annual performance appraisal programs for managers.

The training managers frequently expressed a desire to do a

more comprehensive evaluation, but none of them had plans to develop one. Given the small size of the training divisions, developing, implementing, and coordinating training left little time for evaluation by training administrators.

Training needs can be divided into specific skills that need to be transmitted to the employees and the procedures and tools that the training departments use in order to train the employees.

Generally, common needs for specific skills where identified from the responses of the personnel who were interviewed or from documents. In a few cases, the researchers interpreted the needs from other information. This was true, for instance, in the case of train-the-trainer skills. Skills that two or more of the five agencies indicated that they needed or would like to expand include:

Management
Supervisory skills
Basic skills
Math (more advanced math for specialized personnel)
Electronics
Electrical skills
Machinists
Computer skills for supervisors and craft personnel
Signalling
Microwave
Fiber optics
AC repair
Property management specific to stations
English as a second language
Train the trainer

The area that there was the most consensus about was the need for more training in advanced electronics.

Some of the more serious needs are in the area of training management, procedures, and tools. While these needs generally cannot be met jointly, the training managers can benefit by discussing with each other what they are doing.

Many of these types of needs result from lack of staff and budget and the fact that often upper management and the operating departments view training as a necessary but peripheral activity. One result is that the agencies do not have a systematic procedure for developing courses and curriculum. New courses (and when courses are offered) typically result from stated needs of operating managers. Training development is not tied to strategic or management goals and needs assessments are not systematically done. Thus a related need is greater ties to planning and the decision processes in upper management and in the operating

departments. For example, the training departments should be involved in plans to purchase new equipment.

Similarly, there is little systematic evaluation of the training. All of the agencies need to develop methods of evaluating both the effectiveness of the training and the resulting skill level of the trainees. In some cases, the agencies are hampered in the latter by union resistance.

The agencies also need to do more long range planning for the development of the work force. Two long range issues that need to be given some consideration are the development or discovery of a labor pool from which to draw future workers and the development of career paths for the systematic internal promotion of employees.

Another need is a mechanism to increase union and worker cooperation and involvement in training. The training departments could benefit through greater input from the floor on what skills are needed. And by involving the workers and the union in planning and curriculum development, the training department will be building better understanding of the advantages of training and evaluation to the individual as well as the organization. One result of this understanding might be more acceptance of, if not actual support for, both training and evaluation.

A common problem the training departments have is excessive "no shows," in some cases reaching 50% of the personnel that have signed up and confirmed for courses. This may be related to attitudes in the operating departments.

Some of the agencies have a need to match the timing of courses to the employees who need the training. Because of the small number of people who may need training in a specific skill at a given time, they may have personnel taking the course in anticipation of promotion or after they have been in a position for a year.

And finally, while some of the agencies see great possibilities in expanding their training capabilities through the use of interactive video disks, the costs of development of the software and videos inhibits a more rapid expansion in this area. To the extent that common IVDs can be used, the development costs can be shared between several of the agencies.

As a result of our training needs analysis, our recommendations for coordinating kept two criteria in mind: does it fill a need that could not easily be met by anyone railroad and could it could be easily effected. As a result five recommendations were made:

1. Periodic meetings of training managers to discuss current

problems and solutions

2. Exchange catalogs of training courses and cross registration

3. Joint development of training material (e.g., interactive video disks)

4. Joint application for grants from Department of Labor, Department of Transportation, Department of Education, etc.

5. Work with community colleges as a group to develop rail related courses

Maximum benefits from a joint training program can be achieved through a rail agency/community college joint program with dedicated space on the college campus. Because of the wide geographic area covered by the five rail agencies, they might developed a partnership with a consortium of community colleges, for example, one each in Long Island, New York City, and northern New Jersey.

However, at this time, this concept would appear to be several years away from implementation. Given the current budget constraints within the agencies, the training departments have the immediate priorities of defending their existing programs. Programs that require large investments of money, even those with large future returns in increased productivity and quality of work force, will not receive support from management. Further, the five agencies are used to working autonomously. Even the three MTA subsidiary agencies have only begun to join forces on a few issues. Thus, an approach that allows the gradual development of a coordinated program is the recommended approach.

As part of this project, the first of the periodic meetings of the training directors was held. Metro North hosted the meeting. The training representatives discussed the preliminary recommendations of this project, some of the problems they currently are dealing with, and recent training initiatives at each of the agencies. The training representatives discussed all of the preliminary recommendations (i.e., periodic meetings, exchange of catalogs, joint development of training material, joint applications for grants, and working with communities colleges), but they showed the most interest in joint development of training materials, specifically in developing interactive Video Disks jointly. They agreed to call a special meeting to deal with this topic specifically; the people within the agencies that deal with IVD would attend the next meeting, also to be hosted by Metro North.

A second outcome of the first meeting was the agreement to meet again in the Fall. PATH volunteered to host the second

general meeting. Thus, as this project is coming to its end, the first two steps in the long term plan have been taken.

In summary, the authors recommend that rail transit training departments develop a systematic approach to their total training program. In addition to offering training courses to meet the specific skill deficiencies identified by supervisors and in response to new regulations, they should also tie training to organizational objectives from top management. They should evaluate their training more rigorously. The evaluation should entail collecting quantitative data on before-training performance (e.g., miles per gallon data before training in fuel-efficient operation or passenger complaints per week before a customer service course) to compare with after training performance. With positive quantitative results from evaluation for one or two courses, they should work to build not just support, but a firm commitment both in top management and within the operating departments. With the former the commitment should take the form of additional resources for training and evaluation; with the later the commitment should include the assurance that the department will make provisions so that personnel can be sent to training. The training department should also work with the union to develop a positive union attitude toward training and to develop skills evaluation for all levels of employees.

In order for rail transit agencies to remain competitive and permit them the flexibility that will be needed to deal with rapid changes in the economy, the labor pool, and technological advancement, training is becoming increasingly important. In order for training to properly fulfill its function of organizational and employee improvement, evaluation is a critical component. Given the contradictory situation where education is failing to keep pace with the increasingly sophisticated skills needed for employment, training should emerge as a strategy for success in the coming decades.

Table of Contents


| Chapter | | Page |
|---|---|---|
| Executive Summary | | i |
| I | Introduction | |
| | 1.1 Objectives of Study | 1 |
| | 1.2 Background on training in rail | 2 |
| | 1.3 Study Approach | 5 |
| II | Case Studies of Training in Regional Rail Agencies | |
| | 2.1 Overview | 8 |
| | 2.2 New Jersey Transit Rail Division | 10 |
| | 2.3 Port Authority Trans-Hudson Corporation | 13 |
| | 2.4 Metro North Commuter Rail | 18 |
| | 2.5 Long Island Railroad | 22 |
| | 2.6 New York City Transit Authority | 24 |
| III | Training, Evaluation, and Innovations | |
| | 3.1 Models from the literature | 29 |
| | 3.2 Innovations in Rail Training | 33 |
| | 3.3 Mechanisms for Coordination | 35 |
| IV | Shared Needs of the Regional Rail Transit Agencies | |
| | 4.1 Commonalities in Training among the agencies | 38 |
| | 4.2 Common Training Needs | 41 |
| V | Recommendations and Conclusions | |
| | 5.1 Benefits of Coordinated Training | 44 |
| | 5.2 A Long Term Plan | 45 |
| | 5.3 Progress So Far | 47 |
| | 5.4 Dissemination of Findings | 48 |
| | References | 49 |

# Chapter 1: Introduction

## 1.1 Objectives of Study

In the New York metropolitan region, there are over 50,000 people employed in rail transit in five separate public rail agencies, including both heavy rail (sometimes called subway or rapid rail) and commuter rail. This represents approximately two thirds of all rail transit employees in the United States. Each of these five agencies is struggling to provide quality service while containing their costs.

Training is an important way to improve productivity, efficiency, and quality of service. However, it requires a major commitment of resources. While the improvements in productivity and efficiency would more than repay the cost of training in the long term, transit agencies in general, but particularly the transit agencies in the New York metropolitan region, are operating under severe budget constraints. This makes it difficult to invest money in training which does not have an immediate payback. Thus, the dollars that are committed to training must be spent in ways to maximize their effect.

One way that these five agencies can stretch their training dollars is to combine forces in training. A combined or regional training program would allow them to eliminate duplicate programs, to provide special training in areas where any one of the agencies does not have enough people to warrant a program, to share the special expertise of specific trainers, and to purchase or develop special equipment or programs that would be too costly for one agency. On the other hand, there are difficulties with combining training efforts. These include differences between agencies in equipment and procedures, cost (in money and time) of transporting employees, timing of training courses to meet needs of individual agencies, and some loss of control over the training courses by individual agencies.

The next section of this chapter provides some background on rail transit and training. The third section addresses the method of the study.

## 1.2 Background on Training in Rail

Historic development

Training in rail transit agencies differs from training in many other industries due partly to the historic development of rail transit and partly to the difference in the working environment. The five rail transit agencies in the New York metropolitan region were formed out of several older private companies. Four of the five agencies in the study were formed from larger, intercity railroads that provided freight and passenger transportation. The fifth agency, New York City Transit Authority, was formed from several private (and one public) transit companies.

When the rail companies started operating in the early and mid 1800s, urban rail passenger service were profitable. However, in the twentieth century competition from the automobile cut into the urban rail passenger market, making it unprofitable. The rail companies were heavily regulated; fares, entry, and exit were controlled through either the ICC or the city. Finding it difficult to adapt by raising fares or adjusting service, the railroads responded by disinvesting; that is, by deferring maintenance and expending less time and management attention on improving service or planning for the future.

As the rail companies either deteriorated or went bankrupt, the public became concerned that they would eventually lose rail transit service. In order to maintain transit service, which was acutely needed in a region as densely developed as the New York metropolitan region, local and state governments took over the private companies. By the 1980s the five rail transit agencies had been taken over by one of three different public transit agencies.

Under public ownership and operation, the five rail transit agencies have received more attention and both capital and operating subsidies, resulting in major influxes of capital for new equipment and facilities and improvements in management including training. However, given the past decades of disinterest and disinvestment, the rail agencies still have a large need for additional training.

The four rail transit agencies that developed from intercity railroads share a common pattern of labor relations, largely a result of historic patterns. The railroads were among the earliest industries to develop on a large scale in the United States and as a result they developed their own labor relations environment. Rail unions developed early and they were craft rather than industry unions. As a result, a railroad would have many different unions representing their employees. Thus four of the rail transit agencies have from 10 to 20 different unions. The New York City Transit Authority, on the other hand, has one major union, the

Transport Workers Union (TWU).

Characteristics of rail labor

Working conditions for rail labor also differ from many other industries in that many rail positions require working on board trains or along the right-of-way, either alone or in small groups. Both situations make supervision difficult.

A shift in hiring practices has put a strain on traditional training methods. In the past, a job with a railroad was highly valued. The rail industry paid higher than average wages. Hiring was usually done through relatives and friends. When a job was available, a rail employee would bring in a son or nephew to apply for the job. This resulted in a cohesive labor force. Frequently, there was family pressure on the new employee to do well so as not to embarrass his father or uncle. Railroad families existed in which several generations would work for the same company.

By the time that public transit agencies began to take over rail service, this was changing. First, the sons of rail employees were more likely to go to college and to seek careers in other fields. Second, rail agencies had to meet equal opportunity policies, particularly because of their public nature. Hiring was done on a more formal basis and the hiring of friends and relatives of existing employees (now called nepotism) was no longer an acceptable policy. One result of these new hiring policies was that the new labor force was less cohesive. In some agencies, there developed a split between the old guard, which tended to be white males and share a common loyalty to railroading, and the new employees, who might be black or hispanic or female, and who saw working for the railroad as just another job.

One of the traditions that rail transit inherited from its private rail parents was the promotion of personnel from within the company rather than external hiring. This resulted in managers that knew the rail industry and the internal operations extremely well but frequently lacked managerial skills. Recently there has been a trend toward hiring top management from other companies or from other industries.

Rail transit agencies are faced with a shrinking labor pool, due to the small size of the population cohort that is now entering the job market, as are other industries. In order to fill their jobs, the agencies will have to tap less skilled and less educated sources of labor. This will put new demands on their training programs.

Finally, as is true with many industries, the skills needed in the rail industry are rapidly becoming more sophisticated as advanced electronics and computerization are incorporated in many aspects of the business, such as car components, central control,

and fare collection.

Training in rail

Training had been primarily on-the-job; a new hire would be assigned to work under an employee who had been with the railroad for a while and who (it was assumed) would show the newcomer how to do his job. The advantage of on-the-job training was the low cost for training. No separate training staff had to be hired and there was no lost time (at least, none that appeared on the books) from employees being away from the job. However, many disadvantages were incurred. First, the employee who is supposed to show the new hire how to do the job may not be doing it correctly or in the most efficient way for any of several reasons. He may have learned it incorrectly himself. Over time, he may have developed his own (often poor) habits. New or better ways of doing the job may have been developed since he started doing it.

Second, not all the possible situations that may occur might actually occur during the period that the new hire is receiving the on-the-job training. Therefore, the new employee may be unprepared for emergencies when he is on his own.

Third, the employee responsible for showing the new hire how to do the job may abuse his position by using the new hire as a "gofer" and not showing him how to do some of the procedures. In some cases he may do this because he sees the new employee as a threat to his own job or promotion. When the new hire is of a different race or sex, the likelihood of this happening may be even greater.

Finally, the employee responsible for training seldom has had any instruction in how to train new employees. While he may know how to do the job himself, he may not be able to explain it to the newcomer.

The rail transit agencies are starting more formal training programs to overcome these problems. Training that takes place away from the job site and is done by trainers that have received instruction in training methods (i.e., train-the-trainer instruction) has additional benefits. For instance: General or background principles may be taught in addition to the specific tasks involved in the job; Special job aids may be used, such as videos; and Morale may be improved because the new hire feels that the agency has an interest in him.

On-the-job training is important as a means of reinforcing what the trainee has learned in the classroom. It is on-the-job that the trainee will learn to incorporate his newly learned skills into his working habits. Without this element, the formal training program may be seen as a perk rather than a means of improving performance.

As employees are promoted in the rail agency, they are more likely to be sent to special training programs; for example, a recent article on freight rail supervisors indicated that the majority of the supervisors were sent to management training courses. However, the respondents indicated that the most important source of information was still on-the-job training. (1)

## 1.3 Study Approach

The project had two basic parts. In one part, the existing training and the training needs at each of the five agencies was documented through case studies. A synthesis of mutual needs was then derived from the case studies. This became the basis for developing a program of sharing or coordinating training among the agencies. In the other part, different approaches and innovative ideas in training were documented. These provided ideas on how the five agencies might share or coordinate their training.

As a first step in the project, the study team met with representatives of the training departments of the five agencies as a group to explain the project to them, to get their reactions, and to get their views on their agency's training needs and which of these would be best met regionally. The discussion at this meeting ranged over many issues such as changes in the labor pool, the development of career path programs that might start with high school students, and use of retirees as trainers.

The study team then met individually with a liaison from each agency to get an overview of training at their agency. A two page checklist of information to be obtained was used to guide the interviews, but other than that they were open-ended.

Then in-depth case studies of training at each agency were started. New Jersey Transit was the first agency to be studied. From April to September 1988, individual interviews, typically lasting about two hours, were conducted with the heads of all the major operating departments and of other people that had information or insight relative to training. After all the interviews at the agency were complete, a composite description of training at the agency was written, with a final section on training needs. The composite descriptions drew on other material (e.g., previous needs assessments) when available.

After the composite description of training at New Jersey Transit Rail Division was finished and reviewed by key people at New Jersey Transit, the study team repeated the process at PATH in February and March 1989. Information in this report generally reflects the organizations at the time of the interview. There have been reorganizations and other changes since that time.

The intent was to repeat this process at the three MTA rail agencies; however, due to factors outside the control of the study team, the case studies of the individual agencies had to be discontinued at this point. Less detailed descriptions of training at the three MTA rail agencies were written based on the initial interviews with training department representatives and supplementary documents.

Chapter 2 provides summaries of the training and training needs at each of the five agencies. More detailed descriptions are contained in the appendices to this report.

After the case studies of training were complete, the identified training needs for each agency were compared to determine the areas of mutual need. From the list of the mutual needs, those training areas that are the best suited to a regional approach were identified. Certain guidelines were used to identify those best suited training areas. For example, training topics in equipment-specific or agency-specific areas were excluded. Topic areas where there might be definite advantages from a regional approach were also identified. For instance, a particular topic might be appropriate to only one or two people from each area; aggregating these people from all five agencies would provide a sufficient class size to provide for effective class size. Another type of advantage that regional training might provide is in a topic area where one or several of the agencies have particular expertise; regional training would allow the sharing of this expertise. A third advantage might arise if special equipment or course development is required; regional sharing of the costs of the equipment or development would make the course less expensive to each of the individual agencies. The results of the synthesis are presented in Chapter 4.

After the documentation of training at the five agencies, the study team visited other organizations to find innovative approaches to training, particularly training rail personnel. The appropriate ideas from these visits are presented in Chapter 3.

The study team then generated several ideas on coordinating or sharing training. The ideas were presented to the training representatives from the five agencies in a group meeting. The object of the meeting was both to provide an opportunity for the training representatives to discuss the ideas, but also to implement one of the ideas, specifically periodic meetings of the heads of the training departments to share problems and ideas, that is, a form of networking.

One aspect of the timing of the project is important to the understanding of changes that have taken place. The first meetings on the project took place in early 1987. At the time the national and regional economies were both strong. Some of the ideas for a coordinated approach to training were quite long sighted; for

example, a regional institute for rail training was considered, as were programs to develop interest in rail careers among minority high school and junior high students. Since that first meeting, both the national and regional economies are in recession and the States of New Jersey and New York as well as most of the cities in the region have severe budget deficits. Similarly, all five of the agencies have budget difficulties. As a result, the types of ideas that are feasible for implementation in the near future have changed to those with low cost or with immediate returns in improved productivity or efficiency.

## Chapter 2: Training in Regional Rail Transit Agencies

### 2.1 Overview

As stated above, the five transit rail agencies employ over 50,000 people which represent about two thirds of all transit rail employees in the United States. The agencies are alike in that they provide mass transportation to people within a metropolitan area, they have similar patterns of ridership in that they all have large peaks based on journey to work commutes, they are operating in the same regional environment with many of the same problems (e.g., dealing with the homeless in stations, fare evasion), and they all have major deficits funded from public funds in a region that currently has major public budget problems. On the other hand they differ in many ways also. They range in size from the New York City Transit Authority (NYCTA), the largest transit agency in the U.S. and one of the largest employers in New York, with approximately 37,000 employees in the rail division (internally called the Rapid Division) and about 50,000 overall in bus and rail to the Port Authority Trans-Hudson Corporation (PATH) with about 1300 employees. Table 1 presents employment and other size information on all the agencies.

Three of the rail agencies, New Jersey Transit (NJ Transit), Long Island Railroad (LIRR), and Metro North Commuter Rail (MNCR), are conventional commuter railroads; they use intercity rail equipment (both diesel and electric), have stations spaced at several miles in outer areas, use conductors to collect tickets on the train, have distance-based fares, and predominantly provide trips from suburban areas into the Manhattan central business district (CBD).

NYCTA, on the other hand, is a typical subway system; it uses heavy rail equipment, has stations spaced at half mile and sometimes shorter spacing, charges a flat fare to enter the system, and provides relatively short trips and many non-CBD oriented trips, although there is a large flow into midtown and downtown Manhattan during the rush hours.

PATH represents a hybrid of subway and commuter rail. In most characteristics, PATH is a subway. It uses heavy rail equipment and charges a flat fee to enter the system. However, its ridership is dominated by commuters from suburban (or other urban) areas to Manhattan. Its stations in Manhattan are relatively close together but stations in New Jersey are further apart.

Table 1
Comparative Data for Five Agencies
(1987 Data)

| | NJT | PATH | MTA subsidiaries MNCR | LIRR | TA |
|---|---|---|---|---|---|
| Employees | 3,856 | 1,324 | 6,108 | 6,868 | 37,052 |
| Vehicles | 646 | 241 | 701 | 1055 | 4857 |
| Track (miles) | 767 | 37 | 758 | 701 | 684 |
| Number of stations | 151 | 13 | 105 | 136 | 463 |
| Operating expenses ($1000,000) | 247 | 104 | 375 | 490 | 2,072 |
| Vehicle miles (1000,000s) | 31 | 12 | 32 | 51 | 306 |
| Passenger trips (1000,000s/yr) | 43 | 70 | 55 | 92 | 1,614 |
| Average speed (mph) | 35.7 | 15.6 | 33.9 | 30.4 | 18.2 |
| Ave. Pass. trip length* (miles) | 23 | 5 | 28 | 21 | 4 |

* Average passenger trip lengths were derived from data in the 1986 Section 15 data because some of required information was missing from the 1987 data base.

Source: 1987 Section 15 Annual Report

All five rail agencies are part of a larger public transportation agency. Each of the five also has previously existed as an individual agency or several individual agencies. For all of the agencies the relationships with the larger and sister agencies have not finished evolving. Representatives of several spoke of the need to evolve common cultures. On the positive side, the relationships with parent agencies allow for joint training efforts within these vertical related agencies.

New Jersey Transit Rail Division is part of New Jersey Transit which includes a larger bus division and an corporate division that is responsible for planning and policy. NJ Transit, is in turn, part of the New Jersey Department of Transportation, which also includes the highway department. NJ Transit was formed in 1981 through 1983 from several bus companies and the New Jersey commuter rail operations of Conrail.

PATH is a subsidiary of the Port Authority of New York and New Jersey, which is responsible for the airports and maritime ports, and more pertinently, trans-Hudson bridges and tunnels, the major New York CIty bus terminal, and one ferry service. THe Port Authority, unlike any of the other agencies in the group, also has responsibilities for non-transportation activities such as economic development.

The NYCTA rail division has a sister bus division within the NYCTA, but unlike NJ Transit, the rail division dominates the overall agency. Further, NYCTA, Metro North, and LIRR are subsidiaries of the New York Metropolitan Transportation Authority (MTA), which has other transportation subsidiaries, including bus, rail, and a bridge and tunnel authority. NYCTA is a relatively old agency, having been formed in 1953 out of three separate subway systems and many bus companies.

The LIRR has probably existed the longest as an autonomous agency. On the other hand, Metro North was formed in 1983 from Conrail commuter rail operations in New York. All three agencies were made subsidiaries of the MTA in 1965 or later.

## 2.2 Training at New Jersey Transit Rail Division

The Rail Division is one of three subsidiaries under the Corporate Division. The other two subsidiaries are the Bus Division and Mercer (a recently absorbed bus company). NJ Transit was formed in 1981 and the Rail Division was acquired from Conrail in 1983. One problem that NJ Transit is still overcoming is to blend the corporate cultures of the four separate divisions into one corporate culture.

NJ Transit experiences high turnover among management and professional staff because they have a relatively low salary scale

for the region. This problem is even greater for Rail Division managers because the Railway Retirement System results in their having lower take home pay than the other divisions.

Rail Division Background Information

NJ Transit Rail Division policy on hiring is to post all positions internally first. If there are no qualified applicants, they advertise the position externally. There are no positions that are specifically designated as entry positions. NJ Transit has problems filling craft positions, partly because of their relatively low wage scales and also because, at the time of the interviews, the region was undergoing a building boom.

Applicants for jobs are tested for specific skills. There is little testing of already employed people, other than FRA mandated testing. Many of the union contracts prohibit testing.

The rail division has high turnover among management people (discussed above) and among trainmen and track workers. The turnover problem among newly hired trainmen appears to be due to the long period that trainmen are on call seven days per week. The Rail Division anticipates a problem due to a large number of retirements in the near future.

Management Training

The Corporate Division has a training department which is responsible for management training and also training of the clerical staff. Managers from all divisions may take any of 18 courses on a volunteer basis.

Rail Division Training

Most formal training within the Rail Division is done by the Technical Training Division of the Human Resources Department; training connected with the Book of Rules is done by the Rules Department. However, a large proportion of the training is done informally on-the-job, and therefore does not come under the Technical Training or Rules Department.

The Technical Training Division was in the process of developing separate training modules for supervisors in each of the Rail Division operating departments.

Transportation Department

The Transportation Department includes all on-board personnel (locomotive engineers and trainmen) and the dispatchers. This department has the most formal training of any of the operating departments. The most extensive training is for new engineers.

They receive a formal four module training program that takes approximately one year. The training program entails six exams. Existing engineers also receive a three day refresher course. New trainmen receive a four week course in equipment, operating rules, and customer relations. Existing trainmen take a two day refresher course. Dispatchers have been recruited from block operators and therefore are familiar with the system before moving into the dispatcher position; however, with the change over to CTC, block operators are being phased out. Since the interviews, NJ Transit has started a training program for dispatchers.

The training and training-related needs in the Transportation Department include more management training, training of supervisors, particularly in the area of how to train, and some means of dealing with the high turnover problem among trainmen.

Mechanical Department

The Mechanical Department includes the maintenance of all rolling stock. All entry level people receive an orientation program that lasts from two to eight weeks depending on the craft. The Mechanical Department may start an apprenticeship program for the various crafts.

This department has difficulty finding qualified electricians; they test extensively before hiring, provide some electrical and electronics training during orientation, and have a series of courses on electrical components and electronics for electricians to take. Electrical technicians are responsible for on-the-job training.

Training and training-related needs include more supervisory and management skills (some of which should have been addressed by the new supervisory program); craft skills, particularly electrical and electronics skills and machinists skills; welding, and computer skills. Training in the Mechanical Department also suffers because supervisors have trouble releasing personnel who have been scheduled for training to actually take the time from their jobs to attend the training programs.

Engineering Department

The Engineering Department includes maintenance of track and structures, signals, communications, power, and support equipment. Each group receives a brief orientation program which covers orientation to NJ Transit and rail roads, safety, and some craft specific training. Workers in electrical and electronics crafts can take the same courses that are available to those crafts in the Mechanical Department on a volunteer basis. NJ Transit was in the process of setting up a signal school. Inspectors receive rules training from the Rules Department. Most of the remainder of the training is on-the-job.

Training and training-related needs in the Engineering Department include upgrading signal training as signals become more complex, new technologies (e.g., microwaves, fiber optics), computers, the handling of support equipment, and supervisory training including safety, safety training, managing diverse people, grievance handling, planning and carrying out a job, and providing on-the-job training. They also have a problem with turnover among track workers, the lowest skilled job.

Stations and Facilities Department

The Stations and Facilities Department, the smallest of the four operating departments, includes ticket sales, station maintenance, and terminal operations (i.e., landlord activities). For ticket sales positions, they try to hire people with experience in dealing with the public and handling money (e.g., working for McDonalds). New hires in ticket sales receive a one day course in the three computer systems they handle. The have started a one day course in dealing with the public, communications, and stress control. For station maintenance they try to hire people with janitorial experience; there is high turnover in this position (apparently because the position is seen as low status). The station maintenance personnel receive several one-day training modules in cleaning materials, tools, safe use of materials, etc. The positions in terminal operations are all non-agreement. The personnel are being sent to night school in property management.

Training needs include math, computer skills, AC repair, and rail-station-specific property management skills.

## 2.3 Training at Port Authority Trans-Hudson Corporation

Port Authority Trans-Hudson Corporation (PATH) came under Port Authority of New York and New Jersey (PA) in 1962 as a wholly owned subsidiary. Prior to that, the railroad was operated by the Hudson and Manhattan Railroad, a private company. Its early days as a mail carrier puts PATH under the Federal Railway Act and requires PATH to be a separate corporation within the Port Authority.

PATH is connected to its parent organization as a subsidiary and the executive director of Port Authority serves as president of PATH. This gives PATH access to all PA services including the law department, MIS department, etc.

Entry into the PATH System

Entry into the PATH System occurs primarily from two positions: passenger information agent and trackman. In order to create rosters of qualified applicants for the two positions, PATH conducts massive testing every 2-3 years. During the interval

between tests, hiring is done from the rosters. Since PATH has a policy of training and promoting from within, turnover is relatively low and a relatively high priority is given to training.

PATH Training

Responsibility for training at PATH is located in the Path Personnel Unit under the office of the Training Administrator. This office is relatively new (1986) and does its own assessment of training needs as well as delivery of programs. Further resources for training are provided by the PA particularly at management levels. The training ranges from orientation, given by the recruiters, to technical and supervisory training. Where the training is technical, the PATH Personnel Unit will coordinate with training personnel in the various divisions or will arrange for external resources.

Transportation

This department is a division of Operations and General Services and consists of two units: Train Operations and Passenger Services. Train operations covers all on-board personnel (e.g. conductors, motormen, trainmasters, etc) and dispatchers. Passenger Services positions include information and communication agents as well as account clerks, who have responsibility for collecting and accounting for fare revenue.

Train Operations

Technical Training. For most of the positions in train operations, selection is by both written examination and interview. The first level position in this division, conductor, currently has three weeks of both classroom and on-the-job training covering the technical aspects of the job. Trainees must take a written examination prior to their going on the conductor list so there is evaluation of the training. Both classroom and on-the-job training are also in effect for the positions of towerman, switchman, motorman, and dispatcher. However, large components of the training for these titles remain on-the-job with the trainee working with an experienced incumbent. The position of crew dispatcher is trained entirely on the job. For the job titles of operating engineer, assistant trainmaster, and trainmaster, the technical side of training is entirely on-the-job.

Supervisory & Management Training. Supervisory training is provided for the positions of crew dispatcher. Currently no supervisory training exists for dispatchers although some supervisory training exists for dispatchers after promotion. The position of dispatcher is the first level that can be recommended to the supervisory academy. The positions of assistant trainmaster and operating engineer utilize both in-house management courses and

courses run by various continuing education organizations. One need noted for operating engineers is that of training in labor relations.

Indications for Training. While the technical training needs appear to be met well, the existence of some attitude and discipline problems could stem from the heavy reliance on on-the-job training in various job titles. The assignment of trainees to incumbents needs to be done in a systematic fashion to help provide for the learning of both positive attitudes and proper skills. Those incumbents selected to have a trainee work along side might be given a workshop to inform them of their responsibilities in that position. Finally, the development of supervisory training for dispatchers needs attention.

Passenger Services

Technical Training. All training in passenger services is done on-the-job by supervisors. The position of passenger information agent is a point of entry into the PATH system. Selection is by written examination and interview. The next two positions in the Passenger Service area are Communication Agent and Supervisor of Communication Agents. Promotion to both of these positions is through accumulated experience and interview. As with passenger information agent, no formal training program exists, training is done by the Supervisors of Communication Agents (or the assistant station supervisor or station supervisor).

On the accounting side of Passenger Services are the job titles of Account Clerk II & III, Revenue Supervisor, Assignment Coordinator, and Supervisor of Account Clerks. Again, all training for these positions is on-the-job.

Supervisory Training. The Supervisor of Account Clerks does get some supervisory training but none exists yet for Supervisors of Communication Agents or Revenue Supervisor.

Indications for Training. Areas that need attention include management of public for Passenger Information Agents and computer training for the Assignment Coordinators. As new equipment is introduced (new TV monitors, etc.) additional training will be needed. Given the high level of on-the-job training and the fact that Passenger Information Agent is an entry position into PATH, attention should be paid to those doing the on-the-job training.

For both the train operations and passenger service areas, the budget has not provided for the desirable time to keep individuals in training. In passenger services, refresher training is noted as a need, while in train operations, longer training programs are desirable. However, no new training in the technical area is being planned until FRA implements new operating rules or

recertification.

Maintenance Services This division consists of three departments: Car Equipment Division, Way, Power, and Structures and Signal and Communications. The Car Equipment Division is responsible for the maintenance of the rolling stock and is composed of car repair and car inspection services. Way, Power and Structures is concerned with the maintenance of track and structures, maintenance of stations, and maintenance of power. Signal and Communications is responsible for the design, construction and maintenance of signals and for all communications in the PATH organization. This covers telephones, radio communications and intercoms.

Car Equipment Division

Technical Training. The apprenticeship program in this unit comprises the bulk of the training. The beginning position in the unit is that of car cleaner. This position is frequently staffed by those who enter the PATH System as station attendant. Employees may enter the apprentice program from the position of car cleaner. Apprenticing takes place for craft positions and for car inspections positions. Craft positions include: machinist, electrician, and car repairer (welder, crane operator, AC repairers, and mechanics). The apprentice program is a three year program with both 600 hours of classroom training and on-the-job training. Evaluation is done throughout the program by the examinations apprentices have to take to continue in the program.

Completion of the apprenticeship program results in promotion to journeyman in either the car repair or inspection side of the division. No special technical training appears to exist for foremen.

Supervisory Training. Foremen get no special supervisory training prior to promotion but are eligible after promotion for the supervisory academy. Foremen are encouraged to apply for this. Exempt personnel (i.e., non-union) are eligible for management development courses.

Indications for Training. Refresher training for journeymen is needed. While a recent graduate of the apprentice program is multi-skilled, journeymen lose familiarity with areas in which they are not involved. Another technical area that needs training is that of computer use. Supervisory training is noted for long range planning and for increased use of participatory management, notably quality circles. "Injury-on-duty" while currently seen as a problem is expected to be less of a problem with the move to a new facility. The move to a new, spacious facility is, however, expected to require enhanced supervisory skills and needs for additional technical training.

Similar to Train Operations, the Car Equipment Division would

like to enhance the training budget to permit refresher training.

Way Power & Structures

Technical Training The most frequent entry into the PATH System is in the division of WPS through the position of station attendant or trackman I. On occasion, if a special skill is needed, PATH recruits at a higher level but the policy is to promote from within. All selection is done on the basis on a written examination, interview, and medical examination.

Almost all of the training in WPS is on-the-job. Exceptions to this are noted in the area of Track where some attend a training program run by the NYCTA in Brooklyn, but this does not cover PATH standards. Other training in track includes a four week course for track inspectors run by the NYCTA and a new program planned for the power rail workers. This will be a trades improvement program, not an apprenticeship program.

Way, Power, and Structures looks for people who have some electrical training via other apprenticeship programs or from technical institutes. The position Power Director is noted for getting refresher training annually. The on-the-job training for this position lasts for one to two years.

An apprenticeship program is envisaged for the structural mechanical area for crafts such as carpenters, masons, mechanics, etc. This is currently all on-the-job training as are the machine repair and pumps areas. Applicants for these skilled areas often come from those who have completed the apprentice program in CED.
Supervisory Training Virtually no supervisory training was noted in the WPS Division. Although the supervisory academy is open to foremen, there is less encouragement to attend than from CED.

Indicators for Training. The need for supervisory training for foreman who do much of the on-the-job training seems apparent. Additional need for management training comes from the position of Power Director. Given the high reliance on on-the-job training and a noted problem of absenteeism among some individuals, close attention should be paid to those to whom trainees are assigned. Here too, a workshop for incumbents who are given trainees might prove useful. The reliance on outside training for electrical workers might be an area of common need with other commuter rails.

Signals & Communication

Technical Training. The signal area of this division utilizes six employees to handle the various training programs, mostly in the signal design area. The training program is a three year program with both on-the-job and classroom training. Evaluation is through examination; two failed exams result in expulsion from the program. In addition to this program there are refresher training classes

for signal repairmen at the NYCTA.

Training in the communication area is primarily on-the-job. This includes job titles of repairman I, repairman II, and technician. Employees are likely to pursue training individually through trade schools.

Supervisory Training. In the signal area, foremen and supervisors are eligible for the supervisory academy. Moreover, the instructors have all had train-the-trainer courses. In the communication area, foremen are likely to get additional training from outside courses.

Indications for Training. In the signal area, the noted problem was that of attitude. If this is persistent, then perhaps some of the participatory management tactics tried in CED could be examined. The communications director noted the need for training in standardized methods of installation, trouble-shooting and maintaining the equipment for all repairers, not just trades helpers. In addition, video tapes of how to repair equipment would help as a refresher.

## 2.4 Training at Metro North Commuter Rail

Most training at Metro North is provided or coordinated by the Training and Development Department (T&DD), which has separate people responsible for training in each of the major operating departments. Exceptions are: MIS has a computer training unit; communications and signals does some technical training; Rules (in operations) is in charge of rules certification and the training required for rules certification; personnel does a half day orientation and EAP; and EEO does some equal opportunity training and is starting a sexual harassment program.

Evaluation of the training programs is done with course reaction sheets. T&DD has also recently developed an internal evaluation process. Three T&DD people, not involved with the course, go over each course, materials, etc., and do a critique and make recommendations to improve the courses.

They develop a new course 1) if something changes (equipment or process) or 2) if a department has a problem that they think can be solved with training. T&DD has a program development section that works with the department and with the head of the relevant T&DD section for that department. There is a lot of back and forth between the three during course development. Sometimes a department comes to T&DD with a training need.

There are problems with turnover in MIS and among coach cleaners. There are differences in opinion on whether turnover among coach cleaners is because its a bad job or due to poor work

attitudes. To combat rapid turnover among new hires, MNCR has developed videos that show the nature of the job (both good and bad features) to be shown to applicants.

Available jobs above the entry level are first posted internally; if no one within MNCR is interested, they can then hire from outside.

There is little interaction with training programs of MTA and other MTA subsidiaries. One exception is an outgrowth of an MTA and subsidiary task force on management development. The task force drew up guidelines for management training; since the completion of the study, the MTA has required each agency to develop a curriculum around the guideline. Additionally, MTA has taken on responsibility for executive training for all of the subsidiary agencies.

In another area of MTA coordination, MNCR has adapted the New York City Transit Authority's right-to-know interactive video disk program. The employees can use the IVD at the Grand Central Terminal training center. In another MTA cooperative effort, the NYCTA has adapted the MNCR customer service program. Also, MNCR shares some technical training with LIRR.

Management and Supervision

MNCR runs some assessment centers for specific jobs that are considered particularly important (e.g., facility managers, assistant director of training and development, manager of employment). Skills assessment is part of the management training program.

They use a management program from a training consultant. It is run on weekends. Trainees spend a day watching videos; then they are given a test which is scored by Princeton. Management Development talks with the trainees about their test results and their career interests. They will be matched with an individual self-training program. So far, about 150 people have started the program, through self-selection.

For first line supervisors, MNCR uses a basic supervision course from a training consultant. Supervisors in all departments of Metro North will be required to take it. The first department to go through the program was Maintenance of Way (MOW). They have a special program for track foreman which combines supervision and track maintenance techniques. The program is approximately five weeks long.

In the Mechanical Department, by contract, a foreman can bid any foreman job. Therefore they need more technical subject matter in supervision training. The course lasts 14 weeks. With the new contract (or proposed contract), they will be able to test foremen

applicants, including for technical knowledge. This will simplify the training required.

For middle management, they have three programs:

1) Performance management, a two day course, is required for those who supervise non-union employees. They learn to do Performance Appraisals.

2) Interpersonal management skills is a 3-4 day course on communication.

3) Effective writing is offered on a volunteer basis and is always over booked.

For senior management, they use a training consultant course on group management. Its a 4 or 5 day course but meets only once per week. It covers how to run meetings, etc. They pair people from different departments for the course.

Transportation Department

Assistant conductors receive four weeks of training. Two days are spent on revenue collection. They receive CPR training, which is refreshed annually.

Beginning engineers (train operators) receive one year's training. Most trainees in the first class were Conrail firemen. Since then, trainees have been mostly conductors. There are few requirements for applying for the engineer position; selection is based on interviews and background qualifications. However, testing within the training program is extensive. Training starts with three months of classroom instruction including the book of rules and air brake instruction. Then they get experience on a training train, alternating with days on WICAT video tapes which show train routes as seen through locomotive windshields. On the training trains, they are trained on all MNCR equipment and simulate stops at all stations as if they were carrying passengers. The final phase of training is six months on revenue trains under the supervision of an engineer.

Since the initial interviews, MNCR has acquired a locomotive simulator. It is used for training beginning engineers and for special courses such as energy-efficient train operation and simulation of infrequent events, such as collisions.

The engineers are tested during each phase of training. In the final stages of the training program, they are tested by the rules examiner and, on the train, by the road foreman. There is little turnover among the engineers; it tends to be a life long job. The next possible promotion is road foreman.

Metro North has started a one day refresher course for engineers. It covers rules, new cab signals, and new procedures and equipment. Additionally, they are required to annually review air brakes and fuels.

There are two to three days of training for customer relations. This is one of the first programs that T&DD started. Now customer relations is part of assistant conductor course. The customer relations department, rather than T&DD, now teaches the course to their own personnel.

Mechanical Department

Newly hired Coach Cleaners get four days of training, one day of safety and three days of job-specific training. Newly hired laborers are trained similarly. New electricians get a four week course covering the railroad, their work, safety, and equipment. After training, they qualify for cab signalmen. They try to hire people with electrical backgrounds, so training is mostly railroad specific. (Since the interviews, MNCR has gone from a two week to a 16 week training program for electricians because they were not able to hire enough with adequate skills.) There is a two week program for senior car cleaners, moving up to car inspectors. Finally, they have started a training program for beginning foremen.

English is a problem for custodial workers and coach cleaners. MNCR has done an English as a second language course. There are other problems with basic skills which they have not taken on yet. T&DD staff expect that testing for foremen will bring them out.

Maintenance of Way Department

There is a week long entry program for trade workers which covers the railroad, safety, spiking, jacking up rail, and changing ties. There is no refresher training.

Training for signal repairers is done by the MOW department, not T&DD. It is an ongoing formal program.

Training Needs

The head of training saw the training needs to be a means of making engineer training program shorter and teaching skills for supervisors.

The head of T&DD would also like to see a reduction in classroom training and an increase in computer based training and self-study.

They have no train-the-trainer course (except for defensive driving) but hope to develop one next year. They have sent some

people to an outside program for a course.

Additionally, MNCR is emphasizing customer service which increases the need for improved communication skills among all personnel who come into contact with the public.

## 2.5 Training at the Long Island Railroad

The Division of Employee Training and Development (ETD) is responsible for training at the Long Island Railroad (LIRR). LIRR has more than 80 training programs, 40-50% of which are mandated by contract agreement under federal, state or municipal laws. The content, scope, and duration of these courses are also mandated. There are electrical apprenticeships and training programs for signalmen and for train handling (locomotive engineers) which last 15 months. The programs concentrate on physical characteristics of the railroad such as location of switches and signal systems.

At the entry level there are training programs for engineers lasting 15 months; assistant conductors lasting 27 days; and apprenticeships for electrical and assistant signalmen composed of electricity and electronics lasting a year. There are orientation programs both for technical workers and management. The emphasis is on safety for craft positions and on awareness of the LIRR system for managerial positions.

LIRR has no career path program, but does have a management trainee program. The management trainees are assigned to projects and will be trainees for one year during which time they get experience in operating and support departments.

LIRR is grappling with the problem of retirements due to a new tax law. Anyone employed after 1988 who could retire may suffer a "hit" due to taxes if they do not retire. This could lead to a serious problem for the LIRR if a large number of people choose to retire. If the worst case occurs it would be a particular problem for the Transportation Department because training for engineers requires a long time. Engineers need to be trained on various equipment, need to know the terrain of the system, and need passenger and freight training. Engineer training now consists of riding with engineers. The training staff also rides with trainees and with engineers.

Most positions are filled through promotion within the organization. The internal recruiting process includes looking at absence and disciplinary records. Applicants are interviewed but do not have to take any employment tests.

Evaluation forms are used for course materials. In craft areas, trainees are evaluated by quizzes. This ties into performance evaluation by the employee's supervisor. The

performance evaluations are reviewed by management.

The schedule of course offerings is based on requests from departments. The head of training meets with department heads to determine an annual proposed schedule. From this, he develops a budget and final schedule.

Transportation

LIRR trains 18 - 25 locomotive engineers a year. Most come from the Transportation Department. Once they are in the program, they need to pass tests along the way. At the end of the program, the rules examiners test conductors, assistant conductors, and engineers. Recertification is done every three years. LIRR is considering purchasing a locomotive simulator.

LIRR has special programs for minorities and women. As a result of a consent decree, LIRR offers courses in basic literacy, craft skills, tools and math to provide workers with basic skills. In Operations, courses cover rules and physical characteristics and how to study these on your own. For supervisors there is a program for gang foremen in maintenance of equipment department. These courses resulted from litigation from minority groups. There is a task force to look at the problem of both training needs and displacement.

LIRR uses self-directed learning books and audio cassettes and hope to video tape the physical characteristics of all branches of the LIRR. They have developed their own programs and obtained WICAT equipment, through an UMTA grant, for signal training.

The requirements for the conductors' training program include experience working on a job with customer contacts and handling money as well as some oral communication skills. Within 32 days trainees must pass a test of knowledge of rules and physical characteristics. Instruction is both in the classroom and on-the-job. They get training in ticket collection in the classroom and then are put on the job under experienced trainers of conductors

Mechanical

These is a self-paced course for door circuitry and testing for M1 and M3 electrical cars. At the Hillside location there are programs for electronics training and program machines for trouble shooting. These provide individual progress reports that are available to the training department. Employees use the machines during their lunch breaks. These machines are an adjunct to the regular training programs.

Training needs

Supervisory and management training were difficult areas to address when management attitudes were negative. However, now training is evolving, particularly in the management area. There is coordination with department heads on an as-needed basis.

Sometimes when planned courses are run, attendance is lower than anticipated because supervisors do not release prospective attenders. The head of ETD would like to tie programs to performance appraisals. As needs are identified on performance appraisals (such as "needs communication skills"), those individuals would be targeted for training.

Vocalized training needs include basic skills in electronics, the use of new equipment, and math skills at various levels.

## 2.6 Training at New York City Transit Authority (Rapid Division)

The New York City Transit Authority provides both bus and rail transit. NYCTA is divided into various departments; the two that are relevant to rail training are Operations, and Administration and Personnel. Rail transit, with approximately 28,000 employees out of a total of about 52,000 within the NYCTA, is the responsibility of the Rapid Transit Division within the Operations Department.

The Employee Development and Training Division (EDT), which is in charge of training throughout NYCTA, is one of four divisions in the Department of Administration and Personnel. EDT has about 226 employees, in three divisions: 1) Professional development, including courses for managers, supervisors, and clerical staff; 2) Surface (bus) technical training; and 3) Rapid Transit (rail) technical training.

The Rapid Transit department has five divisions: Car Equipment, Track and Structures, Operations, Stations, and Electrical. Each division has a full time training liaison with EDT. In addition, each Division has some training personnel within the division. (The interviews which were part of this project did not cover training within the Rapid Transit Division.) Numbers of employees and training positions by division (in 1985) are shown in the table on the next page.

Each division also has a budget for courses from outside NYCTA. Such courses have to be approved by EDT.

EDT offers 125 courses, each designed for a specific division's needs. The bulk of the courses are in Car Equipment. In 1987, EDT trained the equivalent of 52,000 people (i.e., person-course combination) including 4,000 transit police.

Table 2
Training within Rapid Transit Division

| | Training positions | Total employees |
|---|---|---|
| Operations | | 7751 |
| Operating Training and Qualifications | 281 | |
| Track and Structure | | 6111 |
| Training and Qualifications | 2 | |
| Car Equipment | | 6502 |
| Human Resources | | |
| Training | 109 | |
| Employee Development | 4 | |
| Stations | | 5842 |
| Human Resources | | |
| Operation Training and Safety | 5 | |
| Electrical | | 2770 |
| Human Resources | | |
| Training | 3 | |

The NYCTA will promote from within before hiring from outside for positions above the lowest levels. A skills test is required for promotion. However, according to a management study, promotion is based primarily on tenure rather than ability (2). Two typical job progressions are: cleaners to maintainer helpers to maintainers and signal maintainer helpers to signal maintainers. The hiring process begins with an advertisement in the paper that a civil service exam will be given. A high school diploma is required. After the exam the applicants are listed in order of their exam score. When new employees are needed, they are taken from the list in order of score.

Promotion to Level 1 supervisory positions requires a written exam. Promotion to Level 2 is based on a performance rating. (2)

The NYCTA has several intern programs. One is the Training Opportunity Program (TOP). The East New York High School of Transit Technology is a vocational school for high school students who want to work at the NYCTA. The students work for pay at the NYCTA for 20 hours per week. The NYCTA also has college interns who work at NYCTA for college credit but no pay. Finally, they are starting a Transit Corps of Engineer program for undergraduates majoring in engineering who want to work as an engineer for the NYCTA when they graduate; they receive tuition rebates and summer jobs. This program is run out of the Personnel Department.

Most supervisors received their training for the supervisory position on-the-job. Seventeen percent had outside training in a workshop or academic program.

They do not have any career path programs but they do have one 20-week upgrade program; the first week is at Manhattan College, the remaining weeks consist of hands-on-experience.

The NYCTA has a goal that 30% of the managers should be women or minorities. They have no special training for women, but do have a course call "Strategies for Minority Managers."

There are some mandated refresher courses for safety-related skills. For instance, right-to-know training must be given annually.

Currently performance appraisals are barely connected to training. However, the performance appraisal form is being redesigned to include recommended training.

EDT is responsible for training the transit police trainers. Transit police are well integrated in the NYCTA training programs. The program emphasizes sensitivity training and the police's peace-keeping role.

They have a phased training program for new supervisors moving from hourly to salary positions. They mix personnel from different departments and each department head speaks to the group. People are chosen for the program by the training liaison in each department.

The EDT has an evaluation group. In each course, the trainees fill out post-course evaluation or reaction sheets. The evaluation group also does a six-month follow-up with the trainees (e.g., have you used the course skills on your job?) and talks to the trainee's supervisor. They also do course-content tests during the courses, particularly for vendor courses and skill courses. If a person in a course does not pass the course-content test, they will inform the department and let them know what the options are (e.g., retake).

The MTA guidelines on management training (see Section 2.4) also apply to NYCTA. To meet the guidelines for all managers and supervisors, EDT will have to triple the current management training, which is on a volunteer basis at this time.

Each department has a training budget for outside vendor courses. They spend most of it on management courses. If the vendor cost is over $10,000, they must issue an RFP and take bids. EDT is supposed to be informed about vendor courses.

They use computer based training, e.g., touch sensitive, interactive video disk (IVD). EDT developed a IVD for right-to-know training, which Metro North also adapted for their own use.

They have found that basic skills training provided by NYCTA (i.e., reading and math) has been poorly utilized because people are reluctant to self-identify. They try to use individual training to allow people to save face. People are more willing to attend outside programs.

Turnover is not a major problem. However 30% of the NYCTA managers have 20 years on more and are eligible for retirement. Also as responsibility is extended to lower levels, some people are quitting to evade it.

To be hired by the NYCTA requires passing a civil service exam. Civil service requirements interfere with developing a technically qualified and motivated management staff.

Training needs

The heads of the EDT Department sees the greatest training need as management skills, basic skills, and literacy. They also mentioned a need for cultural diversity skills and "American English" for people from other English speaking countries.

Several studies have pointed out trends and changes that will affect future training needs (2,3). These include:

Shrinking of the traditional pool of skilled labor which will force companies and agencies to seek entry employees from non-traditional sources including a higher reliance on: minorities, women, immigrants, and underskilled classes.

Increasing technology in the equipment, such as electronic fare boxes and fiber optics.

New (and frequently more technical) operating and managing procedures, including increasing reliance on computers for monitoring.

Internal policy of decentralizing authority, which requires decision-making at lower levels.

Retirement patterns, which are partly a result of a program that allows early retirement for employees that are 50 years old after 20 years with the NYCTA.

One management study makes found the following needs for supervisory training and development:

Basic communication skills need to be covered in more depth (e.g., spelling, vocabulary, grammar, etc.).

Supervisors need train-the-trainer courses geared to preparing them to do on-the-job training

Supervisors need training in problem definition, analysis, and solution with application to performance of workers and finding solutions to problems in their units.

Computer application training is required in order to utilize personal computers and to learn to interpret and use computer generated information. Supervisors specifically need skills in using computer-generated information for monitoring performance against objectives and expenses against budgets.

Training in planning and budgeting that emphasizes goal setting, strategy development, budgeting, and resource allocation and organizing.

The same study suggests other training needs including the growing need to coordinate with other regional transit agencies. This need is exacerbated by a lack of "cross-fertilization" with other transit agencies and low level of outside hiring. Also training needs to address the increase in electronic equipment and the large number of retirees in the near future.

## Chapter 3: Training, Evaluation, and Innovations

The project included the drawing together of useful and innovative ideas on training and joint training from the literature and from other organizations. The training programs at Burlington Northern and Union Pacific were studied for transferable ideas. This chapter presents the best ideas from both sources.

### 3.1 Model of Training

Development of Training

Training should be viewed as part of the organization's means of realizing its goals and strategies. Thus, training development should follow a systems approach, as an on-going process that needs continual modification (4). With this approach, as strategies are developed that guide the entire operation of the agency, training should play a role in realizing these objectives. The objectives for training need to be crystallized from the overall objectives of the organization as they are developed by the top management.

Instructional programs for training, using the systems approach, developed through three phases: needs assessment, selection and design of the specific training programs, and evaluation. The needs assessment phase sets the plan for developing those training programs that are functional to the organization rather than opting for those that are the latest fad. It is at this step that Goldstein (5) suggests strategic thinking plays a role. That is, key players in the needs assessment should reflect upon and define training outcomes that support organizational goals. The second step of needs assessment requires a detailed analysis of the jobs for which the training is to be designed in combination with an analysis of the abilities of the target group being hired for these positions.

Given this information base, the second phase proceeds with specification of the actual training program. Here the determination of performance objectives is critical so that both the most effective instructional techniques can be used to achieve the objectives and so that the third phase, evaluation, can determine if the entire program is meeting its objectives (6).

Since the goal of training, stated or not, is to have the employee perform at some specified level of proficiency, evaluation is vital to training's effectiveness. If training is not meeting its goals, the entire organization suffers. Unfortunately, this

phase of training frequently gets short shrift in many organizations and the rail transit industry is no different.

## The Evaluation Process

Comprehensive training evaluation incorporates both assessment of the process and impact of training. Regardless of the type of evaluation, the evaluation process requires two activities: setting standards or criteria for measuring success and determining the extent to which the training contributes to achieving those standards (5).

Process evaluation. Once a need and its scope have been identified, the initial phase of evaluation focuses on issues such as what type of training would be most useful in ameliorating the problem, what group should receive the training, is the training reaching that group, is the course adequately designed, is the training being delivered as planned.

One technique particularly useful at this stage is content evaluation (7). The first step requires that job elements (required knowledge, skills, abilities) be identified through job analysis. Typically, subject-matter experts evaluate the extent to which the training course content reflects the job or skill domain. As an example, a freight railroad visited during this project, when designing a welding course, had it evaluated both by operating departments and by experts in welding.

Such evaluations help insure that the course is job related. Results can demonstrate either training deficiencies or training excesses. Deficiencies result when high priority training needs are omitted from the training program; excesses reflect an unwarranted amount of emphasis relative to the training need. Both require refining the course.

Process evaluation also includes program monitoring to determine which group needs the training and follows through to see that the group does in fact receive the training. The first objective requires some type of employee diagnosis. This can be accomplished through employee testing, performance appraisal, or supervisory observation. The second objective requires setting goals for supervisors that tie their employee evaluations to their effectiveness in getting requisite training for their employees.

Outcome Evaluation. The second phase of evaluation assesses the outcome or impact of training. This aspect of evaluation seeks to answer the question whether learning took place. Do the trainees know more at the end of training than they did at the beginning? Another critical aspect of evaluation deals with changes in behavior. Is the newly acquired knowledge or skill utilized in the job?

The issues of a change in learning and a change in job behavior suggest the need to evaluate at various times during the training program and to follow through with evaluation when back on the job. While the change in learning can be readily assessed through conventional pre- and post-test measures, assessing behavior changes pose more of a challenge. Failure to use the training back on the job could result from its being unrelated to the job, ineffective, or from a lack of opportunity to practice newly acquired skills. All merit investigation. Those tactics frequently utilized (9) to evaluate changes in employee behavior include certification, licensing, and master job performance. Other tactics, discussed later, involve micro-sampling, control group comparison, critical incidents, and outlier assessment.

Utility of Training. While the immediate outcome to be assessed is properly some change in behavior, unless this skill acquisition has resulted in some type of increased productivity or cost savings, there is little justification for the costs of training. This aspect of evaluation looks at productivity and financial data.

## Models and Examples of Evaluation

Kirkpatrick (9) has suggested four levels of evaluation: reaction, learning, behavior, and results. Each of these types assess different aspects of the training process and outcomes. Reaction is mostly related to the training process and gages the receptivity of trainees to the program and the atmosphere in which the training was delivered. Learning, too, can be a process measure in which the course itself is assessed with an eye towards revising it to establish more effective training. Learning, however, can be an outcome measure in which the trainee is tested on the knowledge and skills acquired. Behavior refers to a measurement of job performance. Kirkpatrick (4) notes that just as a good rating on reaction forms does not guarantee that learning takes place, excellent performance on the training tasks does not insure that the training will have impact on the way the job is performed. Finally, results relate to the way the training programs affects overall organizational objectives. These utility measures permit translation of outcomes to figures that permit comparison between ways of training, between formal training and informal, etc.

Employee Centered Evaluation. This model of evaluation looks at the impact of training on the individual. Assessment of learning could be demonstrated by changes in knowledge and skills pre- and post-training. While utilization of experimental design with control groups yields the most convincing data on the effects of training, situations in industry often preclude use of such controls. A more flexible approach to evaluation is that of quasi-experimental design which depends of several pre-test measures

prior to introduction of the training program. It should be noted that those rail transit training programs which had apprenticeships did regularly test the trainees on knowledge. Further, FRA mandated testing could also serve as an evaluation check by linking performance on FRA tests to training performance.

Besides evaluating performance at the end of training, an on-the-job evaluation is essential to gage whether the acquired skills have been transferred to the job. The difficulty in doing this is that most jobs covered by unions do not have systematic performance appraisal. As a surrogate measure for this, some type of observation form might be developed for supervisors to complete or employees themselves might be trained to keep track of ways that training has been utilized in their jobs through the critical incident technique.

The most promising method, however, of checking on the transfer of skills is through the use of simulators. Long used in aviation, simulators are just beginning to work their way into locomotive engineer training. Both Burlington Northern and Union Pacific have simulators and use them for both new engineer and refresher training. More recently, Metro North installed simulators and LIRR is planning their introduction. These sophisticated devices now give detailed performance indicators in relation to varied simulated work situations. Simulated work situations are also being created for dispatchers' jobs. Related to simulations is the use of models. The Burlington Northern technical training department railroad has replicated portions of its line to scale and uses it to train and test for signal repair. This allows it to simulate various types of signal failure and observe trainees' trouble-shooting skills. As more skills are moved from on-the-job training to systematic training it will become possible to evaluate training performance in greater detail. Underlying all attempts to assess performance is the development of clear cut performance standards for the job in question.

Course and Program Focused. To evaluate the effectiveness of a training course or program, one needs to shift focus from the individual to the group model. In some instances, the evaluation measure will be aggregated individual scores to look at how the group is doing on average; in others, it may be organizational indicators that look at time to complete tasks, quality of the work done, or comparison of this course or program to alternative training tactics.

An intriguing technique for evaluating training that can be applied from medical evaluation is microsampling. In the medical profession, microsampling involves two doctors reviewing a sample of patient charts to identify problems in patient care. This technique could easily be applied to car repair and inspection units where a sample of repaired or maintained cars or engines could be inspected for problems. If problems are identified, then

procedures for solutions can be determined and re-audits done at later dates would determine if the problem has been eliminated.

Another technique from the medical profession is that of outlier analysis. In medical evaluation, outliers are patients whose hospital stays deviate from the norm for that diagnosis. This technique presupposes a good data base which provides normative data concerning the issue. With the proliferation of computers in every area, building such data bases is not unreasonable.

Outlier analysis lends itself to comparisons both between and within rail organizations. Using it within for evaluation of car repair and maintenance, time to failure would be a good index. Using maintenance information systems for equipment would permit analysis of those pieces of stock which had both longer and shorter than the average time to failure. Where information is available from other rail lines between organization comparisons could be made. While there are obviously factors such as age of the equipment, amount and type of use, and environment factors, that detract from direct comparison, these factors can be taken into consideration and handled through statistical control.

Outlier analysis can be applied to other areas of rail operation as well. It is useful for analysis of customer complaints, accident incidents, on-time performance, ridership, fuel consumption, etc.

Organization Focused. In most areas of organizations, requests for new equipment or for increased personnel are accompanied by projections showing increased productivity or decreased costs with resulting savings. In human resources, however, the translation of program benefits into dollars is a new phenomenon. Utility analysis involves detailing the cost of all the factors involved in training and comparing it to the costs of on-the-job training. To accomplish this, the organization needs to know the amount of time it takes to reach a standard of performance for both trained and untrained workers, the difference in performance between the average trained and untrained workers, and the costs of training for the trainee, the trainer and the facilities. Cascio (4) has worked out formulas which transform this information into monetary factors. While it is difficult to assign monetary values to the benefits, failure to do so, Cascio warns, will result in training being seen only in terms of costs.

## 3.2 Innovations in Rail Training and Evaluation

### Training

Both Burlington Northern and Union Pacific are notable for their close ties their local County Colleges. Burlington

Northern's Training facility is actually located on the campus of Johnson County Community College in Overland, Kansas. A building dedicated to Burlington Northern's training was the product of a county industrial revenue bond. The building is leased to the county college and in turn Burlington Northern rents space from the county college. Burlington Northern uses a combination of their own training staff and faculty from the county college.

The advantages of using a county college as opposed to a rail site is that it provides a learning atmosphere. This serves as an incentive to rail employees in that they feel as if the company is both serious about training and willing to treat students in a special way. Further, it provides a place for uninterrupted learning in that the job cannot intervene during the course of the training program. Finally, the resources of the college are now available to the rail training program.

Union Pacific is convinced that Burlington Northern's approach is beneficial to technical training and is planning a similar type of facility on the campus of a county community college. They also have developed a correspondence course in electronics using the faculty of Salt Lake City Community College. This course is voluntary for personnel in signals and communications. It is based on a two-year correspondence course but structured to overcome the weaknesses in typical correspondence courses. The course provides for five face-to-face class sessions, at the beginning and at six month intervals. These face-to-face sessions provide intensive preview of material to come and review and examination of material covered.

The correspondence portion worked was not totally self-paced. Material has to be covered within a specified time and homework has to be returned to instructors within deadlines. Students are encouraged to call both the instructor and fellow students in working on course material and homework. They are provided with course manuals, basic math texts and various electronic equipment on which to get hands-on practice.

This course has the incentive of providing college credit upon completion and it provides the basis for advancement. For those who drop out of the program, no penalty is incurred. These people stay at their current position. Union Pacific believes that any amount of education is beneficial to both employee and company. By providing instructor support and occasional face-to-face sessions, as well as a time structure, this program seems to have overcome problems typically associated with correspondence classes where students have too much freedom. On the other hand, students can complete their training while staying on-the-job. The alternative for Union Pacific for this type of training, would be to pull employees off their jobs for at least a semester. While the cost per pupil is high, it is not as high as releasing employees from their job for a year or having a workforce that is

outdated in electronic skills.

Evaluation

The Burlington Northern training department reported several ways that it evaluated its courses. It used reaction forms for all courses, but new courses are evaluated for a number of months with pre- and post-tests of knowledge and skills. Generally, these tests indicate a 50 to 60% improvement in knowledge and skills. New courses are also evaluated with follow-through interviews of supervisors and trainees about six months after trainees finish the course. After this initial phase, only reaction forms are used systematically with occasional questionnaires sent to supervisors.

In two instances, the training department used behavioral indicators. One involved a training program (referred to previously) to reduce fuel consumption. This lent itself nicely to evaluation in terms of measurable changes and, in fact, fuel consumption was reduced over 10 percent after the locomotive engineers completed the program. In another instance, a needs analysis indicated that only 100 of 840 locomotive electricians were qualified as electricians. Moreover, locomotives had 28 mean days before failure. With the institution of the new training program for electricians, the mean time to failure increased to 78 days.

The technical training department is currently working on an expert system for trouble-shooting on air brakes. Technicians will be trained to use this artificial intelligence system on lap-top computers to trouble-shoot problems. The director of training noted that too frequently wheels are changed when the real problem is in the brakes. By training mechanics to use this newly developed system, saving in parts should be realized. The value of being able to generate performance indicators as a measure of training lies in their ease of being transformed into efficiency measures and their ready communication to management of the value of training.

## 3.3 Mechanisms for Coordination

Several coordinating mechanisms for the training divisions of the five rail transit agencies have been considered. These mechanisms run from most elaborate in the form of a regional transit training institute to simpler administrative activities such as periodic meetings.

At the inception of this research project, the issue of a formal institute for regional transit training was given strong consideration. The proposal spoke to planning a regional transit training institute to meet the common training needs of the rail transit agencies in the New York metropolitan region. The proposed

institute would address training needs at all levels from entry level unskilled labor to executives. While this institute may be realized as a long term goal, more "do-able" goals that could be met in the short term soon replaced this idea. Mitigating against the planning for a regional institute were issues such as financing, working out a common ground for developing a curriculum and continuing needs for equipment-specific training that would still have to be carried out by each agency.

Another vehicle for coordination exists at the level of higher education, both university and community college. Under the aegis of the Region II University Transportation Research Consortium, member colleges in the New York-New Jersey area are collaborating in an Advanced Institute Certificate in Transportation. The curriculum has been set so that it is common for all students although they have the flexibility of enrolling in the most convenient institution. Each institution designates someone to oversee the coordination and running of the program.

At the community college level, a coordinated effort could be modeled on Burlington Northern's partnership with a local community college. The five rail agencies could establish a facility on the campus of a community college. From a coordinating point of view, this arrangement reduces the financial investment needed from the railroad for the physical plant. Such a setting is more conducive to other railroads using the facility since the site is a college campus rather than a specific rail agency facility. In fact Burlington Northern accepts trainees from other railroads. Educationally, the advantage of using a county college as opposed to a rail site is that it provides a learning atmosphere. This serves as an incentive to rail employees in that they feel as if the company is both serious about training and willing to treat students in a special way. Further, it provides a place for uninterrupted learning in that the job cannot intervene during the course of the training program. Finally, the resources of the college are now available to the rail training program.

At the other extreme in terms of resource commitment, the coordination of training could take the form of periodic meetings of the directors of the training departments to discuss current problems and solutions. The cost would be low and no budget is required. The directors would share useful information and would become aware of common problems, thus avoiding the waste of reinventing the wheel. They could also bring other people in their organizations to meetings when pertinent, or they could have them contact each other when they were aware of a benefit from sharing information. By seeing each other formally, the training staffs would feel more comfortable calling each other to share information informally between meetings.

More involved joint efforts could grow out of the meetings. For instance, the agencies jointly develop IVDs, as indeed was

undertaken after the first such meeting of the training directors. THe joint application to federal programs for development or training grants is another possible outcome.

Another coordination approach is to expand the practice of sending personnel to courses offered at other agencies. The first step in this approach would be to exchange catalogs of courses. Thus, the training directors become aware of what courses are offered at the other agencies and would be able to identify courses that would be useful to employees. The second step would be to determine which courses would be capable of absorbing outside students and to establish procedures for registrations and reimbursement. A procedure for evaluating the training from the point of view of the agency that sends its personnel to an outside course should also be developed. A course that meets the needs of the home agency well may fail to meet the needs of an outside agency for any of several reasons. Because the outside agency incurs additional costs by having the employee off the job longer and having to pay travel expenses, they have a greater need to establish the value of the training in meeting the organization's needs and plans.

## Chapter 4: Shared Needs of the Regional Rail Transit Agencies

### 4.1 Commonalities in training among the agencies

All of the rail agencies studied were part of larger regional public transportation organizations. Further, all of the rail agencies had started either as independent private firms or as part of a larger, private interregional rail companies. In most cases the last major change or merge in organization had occurred within the last two decades, and some of the long-time employees still had ambivalent attitudes toward the larger organization. Several training managers spoke of the problem of developing a common corporate culture within their agency.

Each agency had a training division within the human resource department. The training division generally dated from shortly after the shift from the private to the public sector. All of the training divisions were still expanding and the training managers had lists of courses or programs that they planned to develop. In all of the agencies a substantial amount of training, particularly technical training, was done outside the training division, mostly through on-the-job training, but also through other departments, such as Safety or Rules Departments. Long standing training programs that had been developed in response to FRA regulations were often left in the departments that had originally developed them.

The extent of centralization of training within the training divisions varied. In one agency, the training division dealt primarily with management and supervisory training. In others it provided all levels of training from laborer, through craft and technical, to managerial training.

The amount of training provided to the various operating departments differed. Generally, the transportation departments and equipment maintenance departments had the most extensive range of courses, and their employees tended to receive the most training. The track maintenance departments tended to receive the least.

For union-level positions, the agencies tended to promote from within, partially because of union rules. One of the agencies had a management policy of promotion from within. Thus, the majority of personnel is hired based on their qualifications for a relatively low level job. If the agency is to ensure a qualified work force at all levels of union positions, they have to provide the training or other means for the upgrading of capabilities.

At managerial levels, the agencies were more likely to hire from outside the agency and, for support departments (e.g., personnel, MIS, contracts), outside the rail industry. The differences in promotion and hiring policies for union and managerial level positions combined with the requirement of college degrees for higher level positions creates a discontinuity at the point of transition from union to managerial levels, which usually is at supervisory positions. Training managers and heads of operating departments frequently mentioned supervisory training as a major need.

The unions were generally described as supportive of training. However, union contracts at all agencies interfered with some training initiatives. At one agency, the unions refused to allow testing except in a few limited cases. At another agency, a union had opposed the implementation of an apprentice program. On the other hand, one union requested more training in order that maintenance of new equipment be done in-house rather than externally under contract.

All of the agencies provided orientation programs to newly hired employees. The programs varied in extent, the simplest being an overview of the benefits programs, some including an overview of the agencies and safety training, and the more extensive ones incorporating extensive skills training.

None of the agencies had a systematic process of developing courses and course curricula tied to agency objectives, documented skill deficiencies, or identified career paths. Some of the agencies had previously conducted a training needs assessment, but none of them had done one recently. No training manager mentioned organizational goals as a basis for course development.

Most frequently the contents of new courses were based on discussions with department heads. New courses were also developed around the purchases of new equipment. In these instances, the equipment vendor often developed and offered the first course for operating and maintaining new equipment. In some cases the agency would send all relevant employees to the vendor course; in other cases, only key personnel would be sent and they would provide training to the remaining employees. There were frequent complaints about the quality of vendor training, course material, and manuals. The degree of control that the training divisions exercised over the equipment vendor training varied, but it was generally seen as a problem area.

The scheduling of courses was typically based on informal discussions with department heads. Some of the agencies scheduled courses to occur after hiring for specific positions. At other agencies, the courses were offered to several employees at a time while only one or two were actually moving into a relevant

position. Therefore, some employees received training in advance of their actual promotion into a position or after they had been in the position for a while.

Formal training was a combination of in-house courses by the agency's training department, in-house courses provided by training consultants or equipment vendors, and external programs. The latter were most likely to be management programs, but some were technical training in rail-specific topics (e.g., bridge maintenance). The training divisions' involvement in selecting or approving external courses varied. All of the agencies had tuition rebate programs, although eligibility rules differed. At one agency, the employee had to be matriculated in a degree program to be eligible for a rebate. At some agencies, the course or program topic had to be relevant to the employee's job, at others any course could be approved. Due to budget deficits, at least one of the agencies is considering tightening the requirements for tuition rebates.

For some technical positions, the responsibility for training was largely up to the employee. For example, some communications employees received much of their training through external mail or vocational school programs that they enrolled in on their own initiative.

Selection of employees to be sent to training programs is generally done by department heads and supervisors. The training managers did not know how the selections were made. A common problem was that people who were selected (or self-selected) to take part in a training course sometimes did not attend because they were needed in the department on the day of the course. While in a few cases this was due to emergencies, apparently it was more commonly because no plans had been made to replace the employees while they were in training. One response was to over book the courses.

There were several personnel positions that all the agencies mentioned having trouble filling; for example, electricians and electronics workers. The difficulty varied with the relative wage rates paid by the different rail transit agencies. Several agencies were developing extensive training programs or apprentice programs to address their needs for more people or greater skills in these areas.

Evaluation of training was done primarily through trainee satisfaction or reaction sheets, that is, questionnaires filled out by the participants at the end of the course. Questions concerned the quality of instruction, the usefulness of the material, and the facilities. The training manager or course developer sometimes talked to supervisors or managers about the course after the first time it was offered.

Two agencies had formal annual performance appraisal programs for managers. These programs have the potential of being a source of feedback on training needs and the success of training in meeting employee development needs. At one of the two agencies, the appraisal form had a section for recommendations for training and had a place to follow-up on the training recommendations in the previous year's appraisal. However, the training manager commented that the training needs section was seldom filled out and the follow-up section never filled out.

The training managers frequently expressed a desire to do a more comprehensive evaluation, but none of them had plans to develop one. Given the small size of the training divisions, developing, implementing, and coordinating training left little time for evaluation by training administrators.

Finally, some of the agencies are currently coordinating training efforts, at least to the extent of sending employees to courses by the other agencies.

## 4.2 Common Training Needs

Training needs can be divided into specific skills that need to be transmitted to the employees and the procedures and tools that the training departments use in order to train the employees.

Generally, common needs for specific skills where identified from the responses of the personnel who were interviewed or from documents. In a few cases, the researchers interpreted the needs from other information. This was true, for instance, in the case of train-the-trainer skills. Skills that two or more of the five agencies indicated that they needed or would like to expand include:

Management
Supervisory skills
Basic skills
Math (more advanced math for specialized personnel)
Electronics
Electrical skills
Machinists
Computer skills for supervisors and craft personnel
Signals
Microwave
Fiber optics
AC repair
Property management specific to stations
English as a second language
Train the trainer

The area that there was the most consensus that there was a

need for more training was in advanced electronics.

There is a tendency on the part of the agency personnel to claim that the training needs to be either equipment-specific or specific to the individual agency's procedures. However, all of the above skills have generic components in addition to any agency specific knowledge. The generic material can be shared, and the agency specific material can be transmitted through a follow-up class or on-the-job. Either of these procedures can also be used to reinforce the training and to emphasize that the training is not meant to be isolated information; i.e., the purpose of the training is to improve on-the-job performance.

Some of the more serious needs are in the area of training management, training procedures, and training tools. While these needs generally cannot be met jointly, the training managers can benefit by discussing with each other what they are doing.

Many of these types of needs result from lack of staff and budget and the fact that upper management and the operating departments often view training as a necessary but peripheral activity. One result is that the agencies do not have a systematic procedure for developing courses and curriculum. New courses (and the schedule of course offerings) typically result from informally stated needs of operating managers. Training development is not tied to strategic or management goals and needs assessments are not systematically done. Thus a related need is greater ties to planning and the decision processes in upper management and in the operating departments. For example, the training departments should be involved in plans to purchase new equipment.

Similarly, there is little systematic evaluation of the training. All of the agencies need to develop methods of evaluating both the effectiveness of the training and the resulting skill level of the trainees. In some cases, the agencies are hampered in the latter by union resistance.

Systematic evaluation can also contribute to the integration of the training department in strategic planning by other departments by showing other managers the contribution that training can make to their goals.

Similarly, the agencies need to do more long range planning for the development of the work force. Two long range issues that need to be given some consideration are the development or discovery of a labor pool from which to draw future workers and the development of career paths for the systematic internal promotion of employees.

Another need is a mechanism to increase union and worker cooperation and involvement in training. The training departments

could benefit through greater input from the floor on what skills are needed. And by involving the workers and the union in planning and curriculum development, the training department will be building better understanding of the advantages of training and evaluation to the individual as well as the organization. One result of this understanding might be more acceptance of, if not actual support for, both training and evaluation.

A common problem of the five training departments is excessive "no shows," in some cases reaching 50% of the personnel that have signed up and confirmed for courses. This may be related to attitudes toward training in the operating departments.

Some of the agencies have a need to match the timing of courses to the employees who need the training. Because of the small number of people who may need training in a specific skill at a given time, they may have personnel taking the course in anticipation of promotion or after they have been in a position for a year.

Ensuring that equipment vendors provide adequate training and manuals is another area of common need. At least one of the agencies has had some success in improving vendor performance in this area through required review of materials by the training departments and more strict enforcement of the contract. This is an area where shared experience might be of great benefit to the agencies. They may also be able to enforce better performance through joint pressure on the vendors.

And finally, while some of the agencies see great possibilities in expanding their training capabilities through the use of interactive video disks, the costs of development of the software and videos inhibits a more rapid expansion in this area. To the extent that IVDs on common topics can be used, the development costs can be shared between several of the agencies.

## Chapter 5: Recommendations and Conclusions

### 5.1 Benefits of Coordinated Training

The gains to be realized from coordinated training range from the more obvious savings in costs, both monetary and personnel effort, to an increased sense of professionalism among the workforce, to innovation and diffusion of new ideas. Other benefits stemming from coordination of training include that ability to enhance training through expanded course offerings, joint use of new educational technologies, and an heightened status of the training department by increasing the size of the training effort. As the pace for new skills among the workforce quickens, training takes on greater importance in the strategy of the organization and benefits of training magnify.

The realization of savings from coordination stems from the reduction of redundancy in training, increasing the size of training classes, shared costs in course development, and shared equipment for training (both simulators and educational technologies such as interactive video disk). Using hospitals as a example, the spiraling costs attached to medical technologies have caused those who regulate hospitals to allocate different capabilities to various hospitals. In this manner, adjacent hospitals do not duplicate each other in efforts and patients are divided between hospitals in an inefficient manner. Using this as a guide, we can envision various rail agencies developing training capabilities in different specific areas so that there is less overlap when it comes to expensive equipment. The reference is always to generic types of training that are done by each of the rail agencies and are not specific to the type of equipment used or to organizational policies or procedures. As part of this, there is also a reduction in redundant personnel effort so that training personnel are freed to develop a wider range of courses or to implement more meaningful course and program evaluations.

The other major benefit to be derived from coordinated training stems from the infusion of new ideas and the increased status attached to training and to the workers as they develop contacts with personnel outside their own agency. Coordinated training, through the mechanism of training directors' meetings, provides the various training directors with ideas that have already been developed in other agencies. It also encourages the generation of new ideas though joint problem solving.

Enhanced status of training through increase of the size and scope of the training effort should promote a greater sense of

professionalism of the work force. Moreover, this enhanced status should redound to the training department and make strategic planning for training easier. A greater sense of professionalism in the workforce is thought to derive from merging personnel with employees in similar positions in other companies. This should provide for a more cosmopolitan orientation toward organizational issues as the employees recognize that there are other ways to handle problems and that problems that might appear local are more regional in nature.

## 5.2 Long Term Plan

Maximum benefits from a joint training program can be achieved through a rail agency/community college joint program with dedicated space on the college campus. Because of the wide geographic area covered by the five rail agencies, they might developed a partnership with a consortium of communities colleges, for example, one each in Long Island, New York City, and northern New Jersey. The benefits of this approach include:

The training program would have access to the faculty and many educational facilities of the community college.

By joining with an existing community college, the individual agencies in the rail consortium would automatically have access to a campus that was neutral ground without having to invest money in land and new buildings. As the joint program expands, they can add buildings at such time as they are needed.

The program would include some courses specific to rail, taught by experts recruited from the training departments of the five rail agencies.

The college campus would be a logical place for the installation of complex and expensive training equipment that the agencies would share.

It would also allow rail personnel to take courses not specific to rail, such as management or labor relations.

The rail agencies and the community college could develop programs for rail employees with high school degrees that have management potential but do not have the required college degrees. By started at a community college in an atmosphere that the student is already familiar with much of the trepidation about entering a college program at mid career will be removed.

The rail agencies could recruit new employees from the pool of students at the community college.

The community college would also benefit from this effort, by:

Their students would have access to a new program with good employment opportunities.

The rail program would provide a stable program with funding.

However, at this time, this concept would appear to be several years away from implementation. Given the current budget constraints within the agencies, the training departments have the immediate priorities of defending their existing programs. Programs that require large investments of money, even those with large future returns in increased productivity and quality of work force, will not receive support from management. Further, the five agencies are used to working autonomously. Even the three MTA subsidiary agencies have only begun to join forces on a few issues. Thus, a phased approach that allows the gradual development of a coordinated program is recommended.

Step 1: Networking among the training directors. The first step is to facilitate communication among the five training departments on a regular, periodic basis. The managers would meet every few months to discuss mutual problems and trade new ideas and programs. When they discovered areas that would benefit from a joint effort, they could pursue them. One of the immediate benefits of the networking would be trading of information on many topics, such as quality of consultants, new software, and working with equipment vendors. The directors would involve other training personnel in the meetings as they felt would be beneficial. This phase would not require a separate budget.

Step 2: Joint problem solving. Some of the issues that would come up during the meetings will be appropriate to joint efforts. The training directors would pool efforts and resources for the solution of specific problems when it is appropriate.

Step 3: Cross registration. The training directors would become aware of courses offered at the other agencies both informally, through conversations, and formally, through the exchange of training course catalogs and schedules. They would expand the currently minimal practice of sending employees to courses at other agencies, to the extent that there were openings in the courses. This would allow their employees to take courses that the home agency might not offer or might not be planning to offer in the near future.

Step 4: Development of new courses. There are several topics for which there is a recognized need for training, but for which there are not enough people in a single agency who need the

training to warrant a full course. Between the five agencies, one agency can take the lead in developing the course with the knowledge that the course will be filled by drawing on personnel from several agencies. The directors would develop a policy for charging for outside people to take the course.

Step 5: Development of college and High School programs. Training personnel from the five agencies would work with one or several community and/or senior colleges to develop college degree programs appropriate for rail personnel. This would be a formal expansion of development work already started by the New York City Transit Authority and John Jay College.

One of the first needs mentioned by the representatives of the five training programs was the development of a labor pool from which to draw entry level employees. The group of training directors could establish an outreach program to make high school students aware of careers in rail transit. The initial phase of this program might simply be visits to high schools to establish awareness. The program might expand to working with regional high schools to develop special vocational programs for rail careers such as NYCTA has established in East New York.

Step 6: Rail/community college partnership. As the rail agencies and community college worked together on developing degree programs (Step 5), they would be establishing the working relations for developing a special rail training program within the college campuses, described above.

## 5.3 Progress So Far

To keep the group of training directors in communication, semi-annual meetings will be held to discuss joint problems and possible solutions. These meetings will also serve as a chance for each agency to share catalogs, new courses and new areas to be developed. As a result of the first meeting, a separate meeting to consider joint development of training courseware on Interactive Video Disk has been arranged.

As part of this project, the first of the periodic meetings of the training directors was held. Metro North hosted the meeting. The training representatives discussed the preliminary recommendations of this project, some of the problems they currently are dealing with, and recent training initiatives at each of the agencies. The training representatives discussed all of the preliminary recommendations (i.e., periodic meetings, exchange of catalogs, joint development of training material, joint applications for grants, and working with communities colleges), but they showed the most interest in joint development of training materials, specifically in developing interactive Video Disks jointly. They agreed to call a special meeting to deal with this

topic specifically; the people within the agencies that deal with IVD would attend the next meeting, also to be hosted by Metro North.

A second outcome of the first meeting was the agreement to meet again in the Fall. PATH volunteered to host the second general meeting. Thus, as this project is coming to its end, the first two steps in the long term plan have been taken.

## 5.4 Dissemination of Findings

The findings of the project have been transmitted and discussed with the five target agencies on several occasions, most particularly during the final meeting noted immediately above. In addition, the several copies of the final report will be given to each of the five agencies and the project team will stay in contact with the agencies to facilitate coordination in the future.

The findings have been disseminated to the transportation community as a whole through two presentations at the annual meeting of the Transportation Research Board and through to forthcoming publications:

"Training and Evaluation in Commuter Rail," by C.E. McKnight and N. Rotter, in Transportation Journal.

"Evaluation of Training Programs in Rail Transit," by N. Rotter and C.E. McKnight, in Transportation Research Record.

The investigators anticipate submitting at least two more articles based on the project for publication.

## References


1. K.H. Horn. "Railroad Operations Supervisors: A Case Study," Transportation Journal, 1989, 28, 44-55,

2. Management Education Study, New York City Transit Authority, March 1988, Volume I: Supervisory Survey and Volume II: Management Survey.

3. MTA Management Needs Assessment, Final Report, prepared by TPF&C, December 1988.

4. W. F. Cascio. Managing Human Resources: Productivity, Quality of Work Life, Profits, 2nd Edition, New York: McGraw-Hill, 1989.

5. I. L. Goldstein. Training in Organizations: Needs Assessment, Development and Evaluation, 2nd Ed. Brooks/Cole, Pacific Grove, CA: 1986.

6. R.F. Mager. Preparing Instructional Objectives. Belmont, CA: Frearon, 1962.

7. J. K. Ford and S. P. Wroten. Introducing New Methods for Conducting Training Evaluation and for Linking Training Evaluation to Program Redesign. Personnel Psychology, 1984, 37, 651-665.

8. D. C. Brandenburg. Evaluation and Business Issues: Tools for Management Decision Making. In R. O. Brinkerhoff (Ed.) New Direction for Program Evaluation, No. 44: Evaluating Training Programs in Business and Industry, San Francisco: Jossey-Bass, 1989, 83-99.

9. D. L. Kirkpatrick, Techniques for Evaluating Training Programs. Journal of the American Society of Training Directors, 1959, 3, 3-9, 21-26.




*U.S. G.P.O.:1993-343-273:80178

## NOTICE

This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

The United States Government does not endorse manufacturers or products. Trade names appear in the document only because they are essential to the content of the report.

This report is being distributed through the U.S. Department of Transportation's Technology Sharing Program.

**DOT-T-92-08**

BEST COPY AVAILABLE

*TECHNOLOGY SHARING*

A Program of the U.S. Department of Transportation



BEST COPY AVAILABLE